

## CLAIMS

What is claimed is:

- 5        1. A method for determining the genotype of a target single-stranded polynucleotide immobilized on a solid support, said method comprising:
  - a. contacting the target polynucleotide with a probe polynucleotide under conditions in which the target polynucleotide and probe polynucleotide are capable of forming a target partial duplex;
  - 10        b. contacting the target partial duplex with a reference nucleic acid under conditions in which the partial duplex and reference nucleic acid are capable of forming a four-way complex;
  - b. subjecting said four-way complex to branch migration conditions, wherein the four-way complex is capable of migrating if there is no net increase in the number of mismatches in the complex during migration, and wherein the four-way complex is capable of forming a stable four-way complex if there is an increase in the number of mismatches in the complex during migration;
  - 15        d. detecting or quantitating the release of the probe polynucleotide or release of a strand of the reference polynucleotide from the solid support as an indication of the genotype of the target nucleic acid.
- 20        2. The method of Claim 1 wherein said nucleic acid sequences are DNA.
- 25        3. The method of Claim 1 wherein said four-way complex comprises a Holliday junction.
4. The method of Claim 1 wherein the probe polynucleotide can be detectably labeled.
- 30        5. The method of Claim 1 wherein at least one strand of the reference nucleic acid can be detectably labeled.
6. The method of Claim 1 wherein release of the probe polynucleotide or release of a strand of the reference polynucleotide is detected by hybridization or electrophoresis.